CALIFORNIA DEPARTMENT OF WATER RESOURCES

California Water Plan Update 2018 Plenary

October 9 and 10, 2018

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California Water Plan Update 2018 Plenary

Welcome and Greetings

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DWR Director Karla Nemeth

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A Day Without Water

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California Water Plan Update 2018

Critical Challenges and Their Root Causes

Paul Massera, P.E.

Water Plan Program Manager

October 9, 2018 | Water Plan Plenary

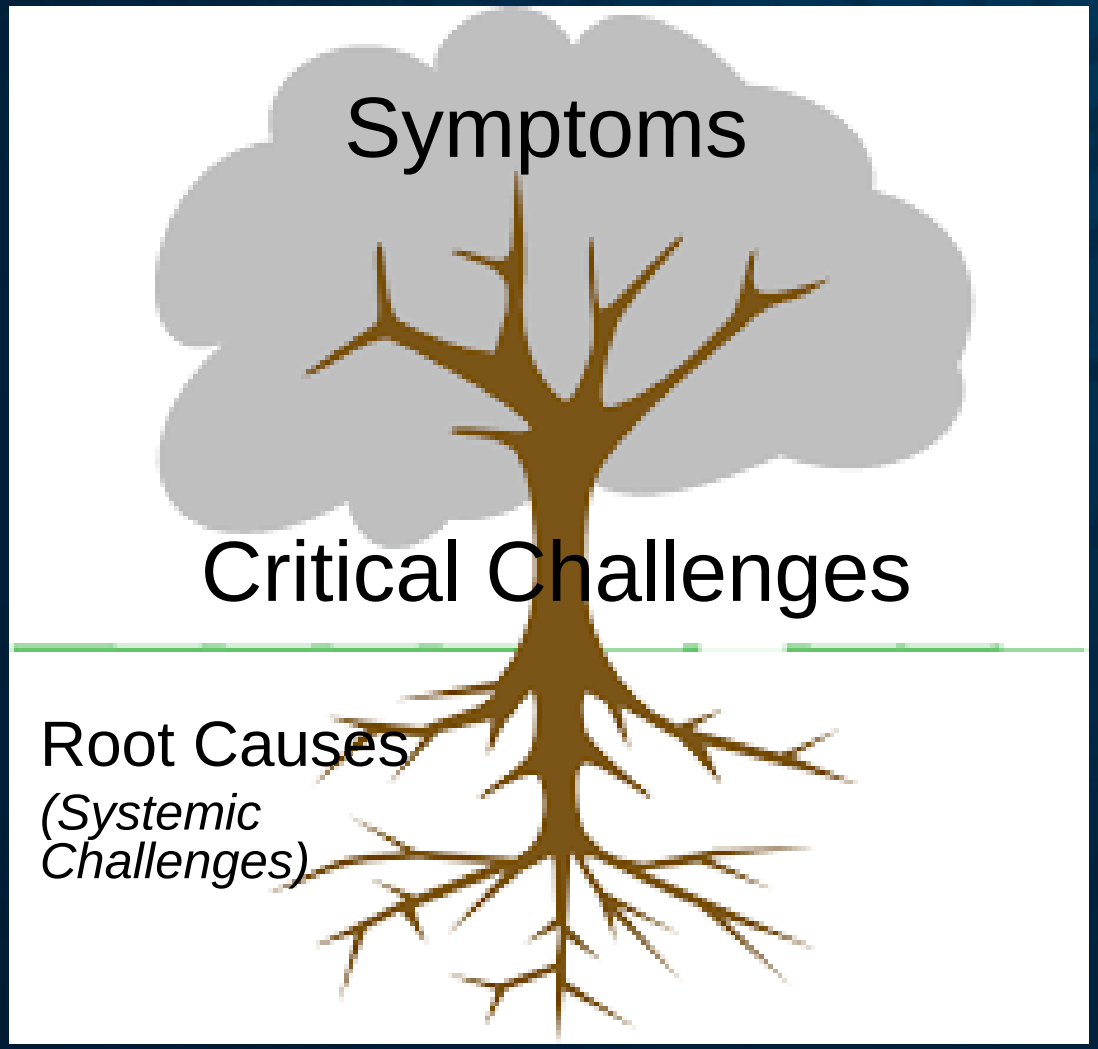
Session Purpose

Describe State water management challenges that drove Update 2018 recommendations

First some good news…

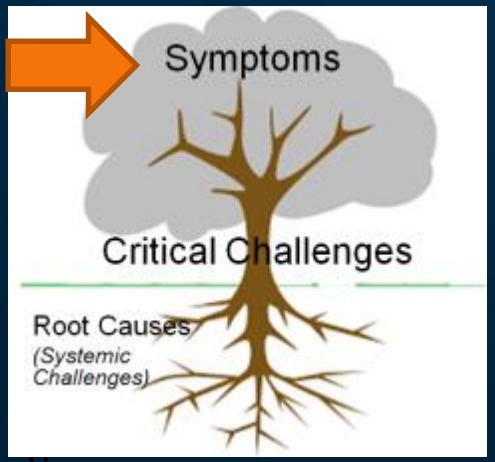
- Many regional and local entities effectively and efficiently serve their constituents.
- Communities that proactively planned and invested have shown considerable resilience.
- Past GO Bond investments have delivered value.
- Significant additional GO Bond authorizations.
- Increased public awareness of CA water.
- SGMA sets stage for GW sustainability.

Framing the Challenges



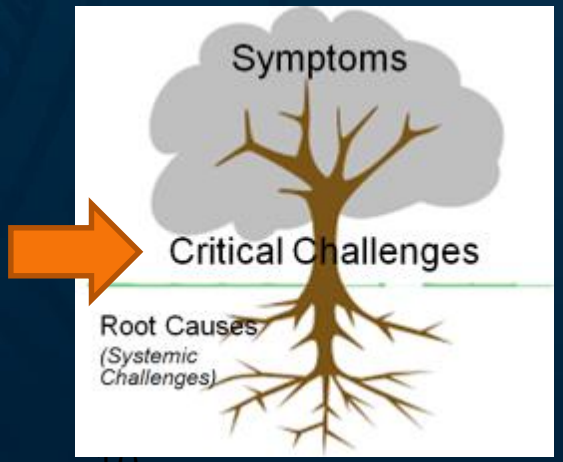
Symptoms

1. Reduced Public Health and Safety
2. Economic Impacts
3. Struggling Ecosystems
4. Reduced Quality of Life



Critical Challenge Categories

1. Aging Infrastructure
2. Climate Change
3. Population
4. Natural Hazards
5. Ecosystem Declines



Critical Challenges
Aging Infrastructure

1. Increasing Flood Risk
2. Reduced Access to Clean, Safe, Reliable, and Affordable Water Supplies
3. Water Quality Degradation
4. Sacramento-San Joaquin Delta Conflicts

Critical Challenges
Climate Change

1. More-Extreme Hydrologic Events
2. Declining Groundwater Levels
3. Declining Forest and Headwaters Health
4. Catastrophic Wildfires
5. Increasing Flood Risk
6. Water Quality Degradation
7. Sacramento-San Joaquin Delta Conflicts

Critical Challenges
Population

1. Changing Demands for Water
2. Increasing Flood Risk
3. Reduced Access to Clean, Safe, Reliable, and Affordable Water Supplies
4. Declining Groundwater Levels
5. Water Quality Degradation

Critical Challenges
Natural Hazards

1. Catastrophic Wildfires
2. Increasing Flood Risk
3. More-Extreme Hydrologic Events
4. Earthquakes

Critical Challenges
Declining Ecosystems

1. Declining Forest and Headwaters Health
2. Declining Groundwater Levels
3. Water Quality Degradation

Critical Challenges

More-Extreme Hydrologic Events

1. Extended Drought (2012 – 2015 driest in 1200 years)
2. Extreme precipitation in 2017 *(wettest winter since early 1980's)*

Critical Challenges

Declining Groundwater Levels

1. GW provides about 30 – 60%% of water supplies.
2. Up to 13 maf of change in GW storage in Central Valley aquifers 2005 – 2010.

Critical Challenges

Increasing Flood Risk

1. Currently:
   - 1 in 5 Californians live in a floodplain.
   - Nearly $600 billion in assets at risk.

2. Expectations:
   - More precipitation falls as rain than snow.
   - More communities are situated in floodplains.
   - Maintenance is deferred on existing infrastructure.

Critical Challenges

Declining Forest and Headwaters Health

Headwaters = primary water source for California

1. 129 million dead trees attributed to drought.

2. Affecting forests' capacity to:
    1. Naturally regulate streamflow.
    2. Buffer water quality.
    3. Reduced functioning of wet meadows
    4. Perennial streams becoming intermittent
    5. Reduction in riparian habitat.

Critical Challenges

Declining Ecosystems

1. Relative to other water sectors ….Ecosystem restoration has been an investment priority of Californians.
2. The same is true for forest and headwater management.
3. Example: More than 150 species are listed as Threatened or Endangered in California

Critical Challenges

Catastrophic Wildfires

1. 2017:
   A. 46 deaths (not including landside fatalities)
   B. 1,436,558 acres burned
   C. 10,822 structures destroyed
   D. Tens of billions of dollars in losses and associated costs.

2. More extreme wildfires are expected because of:
   A. Extreme tree mortality
   B. Increased fuel loads
   C. Climate change
   D. Continued urban development in and near wildlands.

Critical Challenges

Unstable Regional Economies

1. Less supply reliability = more economic volatility.
2. Agricultural costs statewide from the drought total more than $1.8 billion, loss of 10,100 jobs.
3. Disproportionate harm to people with least capacity to respond to changes.

Critical Challenges

Changing Demands for Water

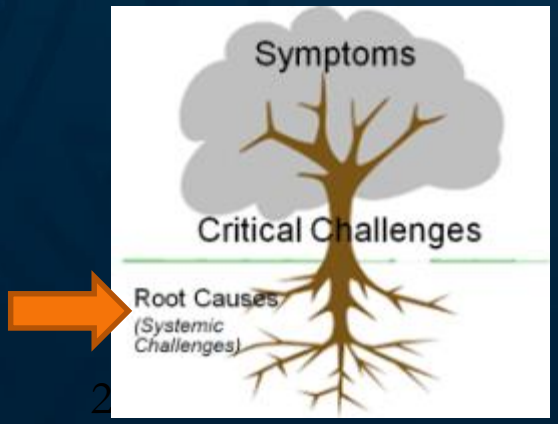
1. Population could increase from 39.4 million in 2016, to 51.1 million by 2060.
2. Urban water demand increase from 1 maf to 7 maf per year by the year 2050.
3. Potential decrease in agricultural water demand ranging from 2 million to 6 maf by 2050
4. Other challenges:
    1. Improvements in conservation and water use efficiency
    2. Shifts in agriculture to permanent crops.

Root Causes

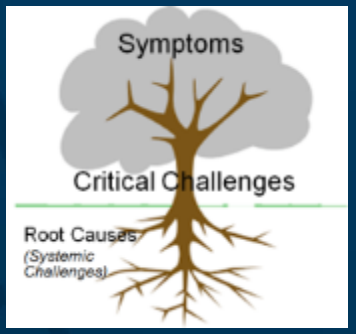
Update 2018 provides strategic recommendations based on two questions:

Why do these critical challenges exist?

Why do they persist?



Root Causes

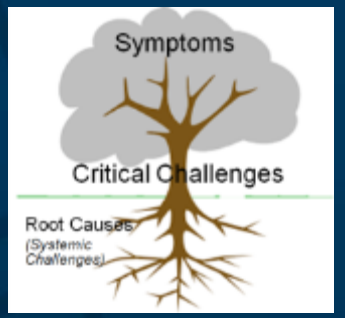


Fragmented and Non-Coordinated Initiatives and Governance

1. Lack of shared intent among plans.
2. Some instances of inadequate coordination between land-use and water planning.
3. More alignment of efforts needed among local, regional, State, and federal agencies and California Native American Tribes.

Root Causes

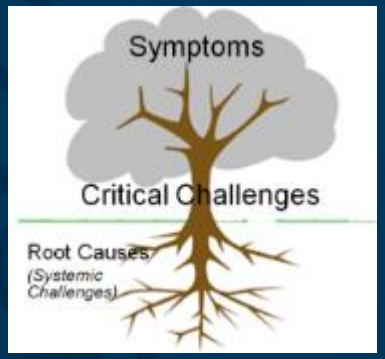
Inconsistent and Conflicting Regulations



Regulations are important for public health and safety, and environmental protection. Yet, at times:

1. Institutional silos.
2. Do not achieve their intended outcomes.
3. Focused on mitigating project impacts.
4. Do not balance environmental needs and human activities.
5. Not adaptive.

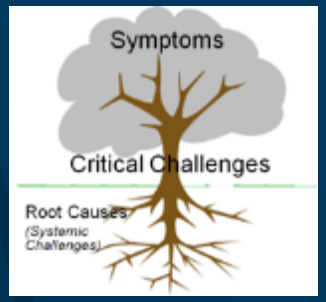
Root Causes



Insufficient Capacity for Data-Driven Decision-Making

1. Effective decisions = appropriate use and interpretation of data.
2. Access to the data technical information.
3. Data-sharing and management would benefit from:
   A. Authoritative, open-access platform .
   B. Integration of subject expertise and stakeholder perspectives.
   C. Coordination and sharing among agencies.

Root Causes



Insufficient and Unstable Funding

1. Often inadequate, unpredictable, and inflexible to effectively fund all State responsibilities (including local assistance and cost-sharing).

2. Other challenges:
   - Changing public priorities.
   - Competition with other public services.
   - Reduced revenue collection.
   - Legal and jurisdictional constraints.
   - Flood management and ecosystem s face additional funding challenges.

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Investing in a Shared Vision for California's Water Future

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California Water Plan Update 2018

Investing in Shared Vision for CA Water Future

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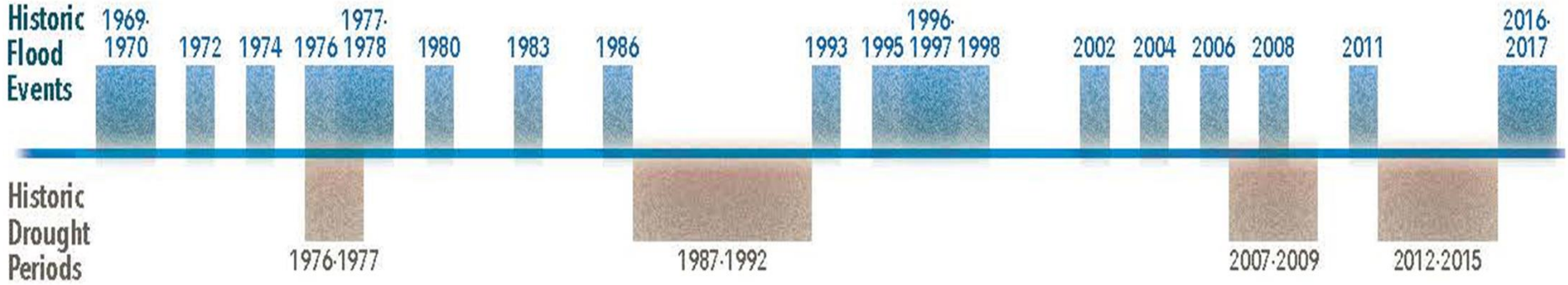
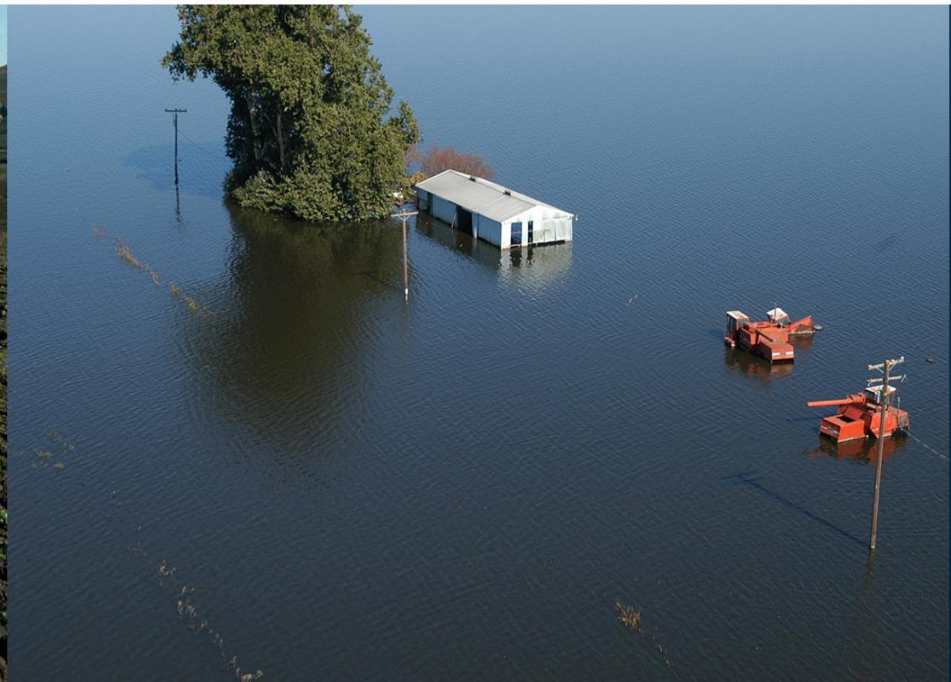
California's Water Management
A Tale of Two Extremes





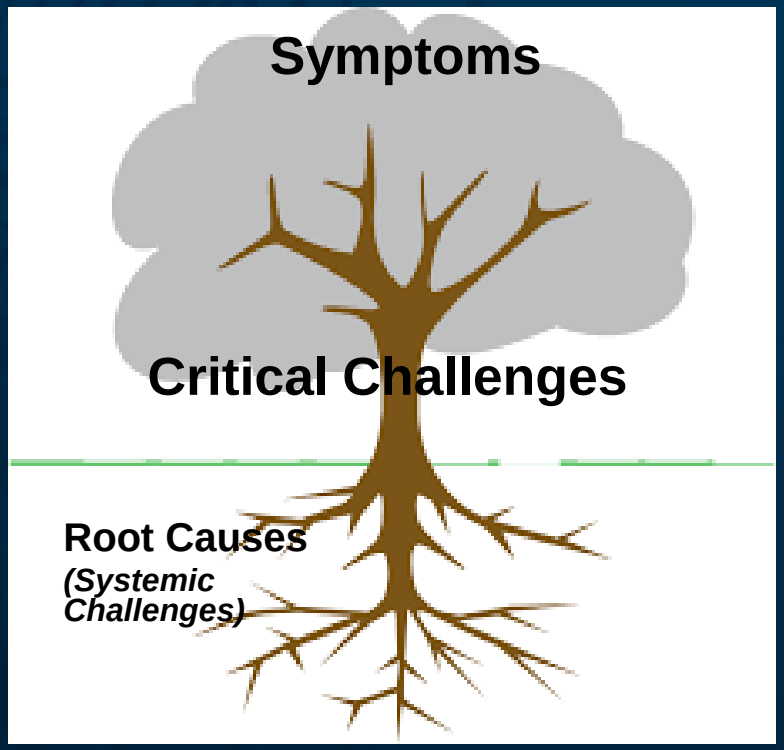
Challenges to Sustainability
Threaten the People & Ecosystems of CA

- Greater Drought Impacts - Unreliable Water Supplies
- Increasing Flood Risk
- Groundwater Depletion & Subsidence
- Degraded Water Quality
- Declining Environmental Conditions
- Aging Infrastructure
- Climate Change Impacts

Low water level at Folsom Lake (January 2014)

Root Causes are Systemic Challenges
Overcoming them Increases Return on Investment

- Fragmented and uncoordinated decisions, initiatives & actions
- Inconsistent, inflexible, & conflicting regulations
- Insufficient capacity for data-driven decision-making
- Insufficient & unstable funding



California Water Plan Update 2018
Focus & Features

- Operational definition of sustainability
- CA Water Today
  - Challenges & Drivers
- Actionable recommendations
- NEW - Implementation Plan & Funding Options
- NEW - Annual Reports to track progress & adapt

California Water Plan Update 2018

Table of Contents – Under 100 pages

Chapter 1: Envisioning California Water Sustainability
Vision and goals to manage water resources for sustainability in California

Chapter 2: California Water Today
Conditions assessment – status, trends, accomplishments, and initiatives

Chapter 3: Actions For Sustainability
Recommended actions for the next 5 to 50 years

Chapter 4: Sustainability Outlook
Tracking sustainability and return on investment (outcomes, indicators & metrics)

Chapter 5: Investing in Water Resources Sustainability
Implementation cost, funding mechanisms, and funding scenarios

Chapter 6: Implementation Plan and Funding Options
Actions, actors, schedule & funding options

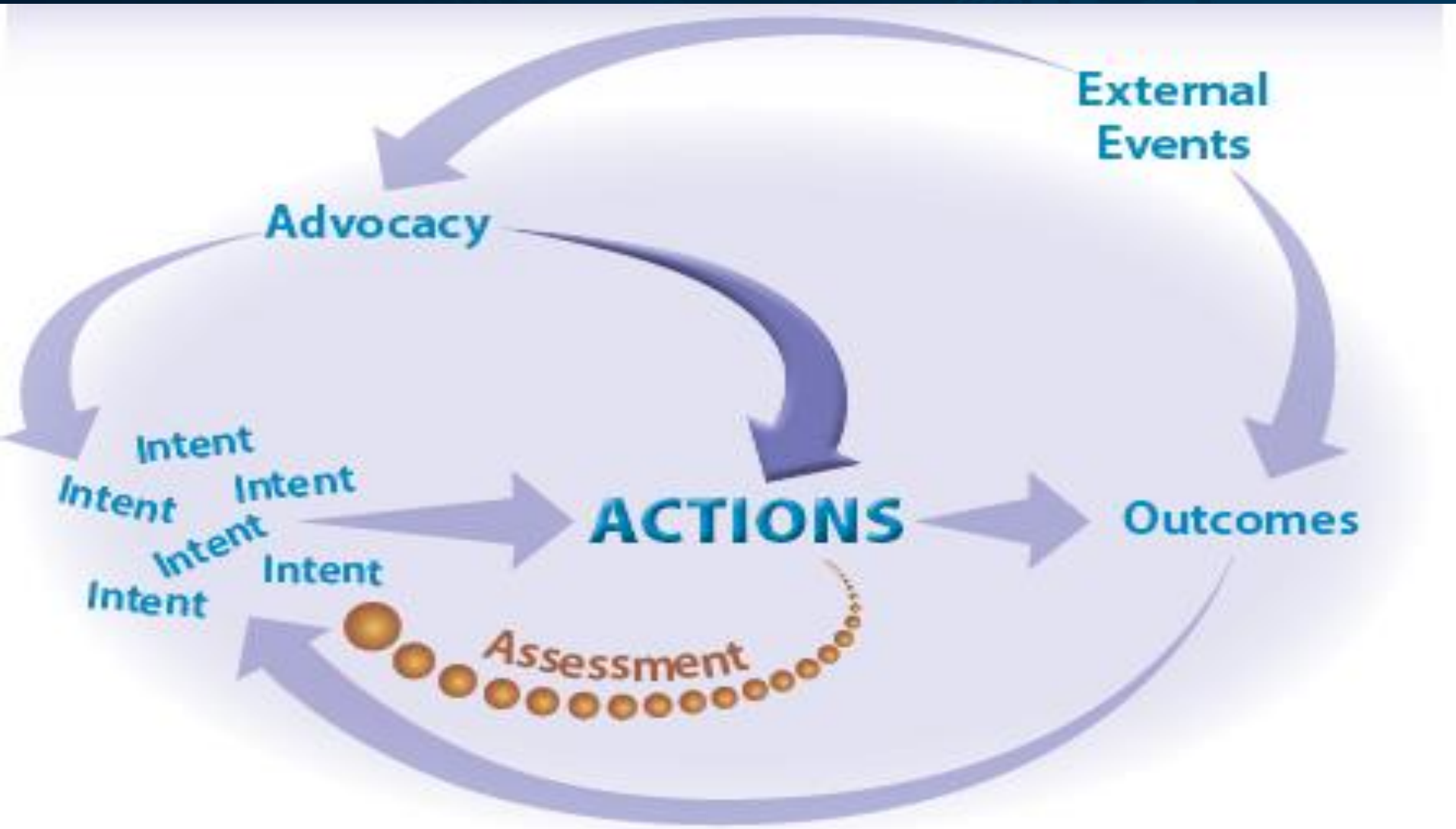
Reactive Water Management
Is Not Sustainable

Historically, water management has been reactive and focused on individual projects

Repair … aging infrastructure + Ration … in response to drought + Regulate … to respond to crises & comply with statues

Sustainability

Today's Water Management System
Favors Advocacies and Actions



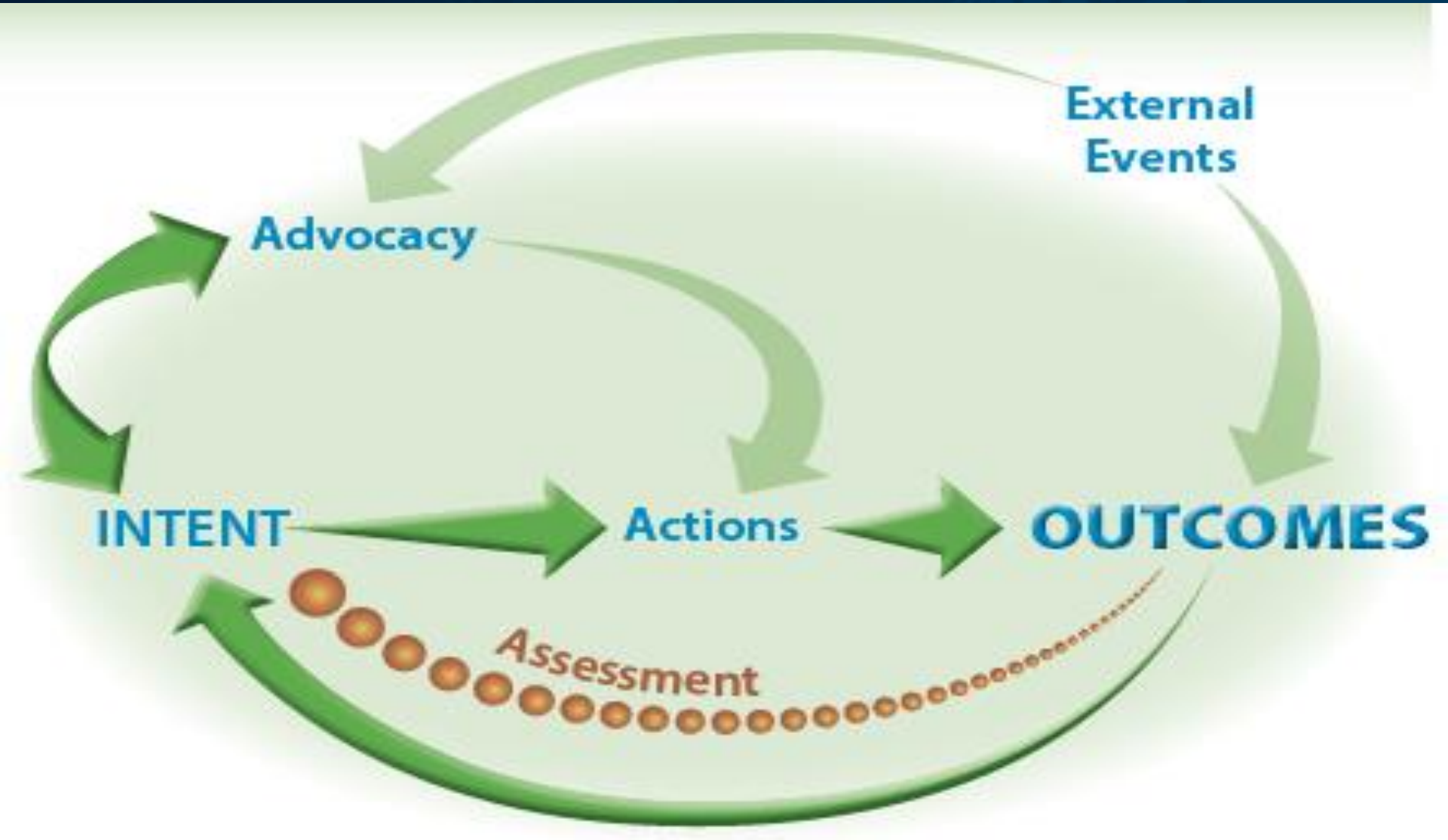
Water Resources Sustainability
Requires Several Ingredients

- Taking a long view & vision
- Shared intent & outcomes
- Alignment & integration
- Consistency with what Californians value
- Time and commitment

Sustainability Requires
Taking a Long View & Vision

- All Californians are protected from health and safety threats and emergencies.
- California's economy is healthy and all Californians have opportunities for economic prosperity.
- Ecosystems in the state are thriving.
- All Californians have opportunities for enriching experiences.

Sustainability Requires
Shared Intent & Outcomes



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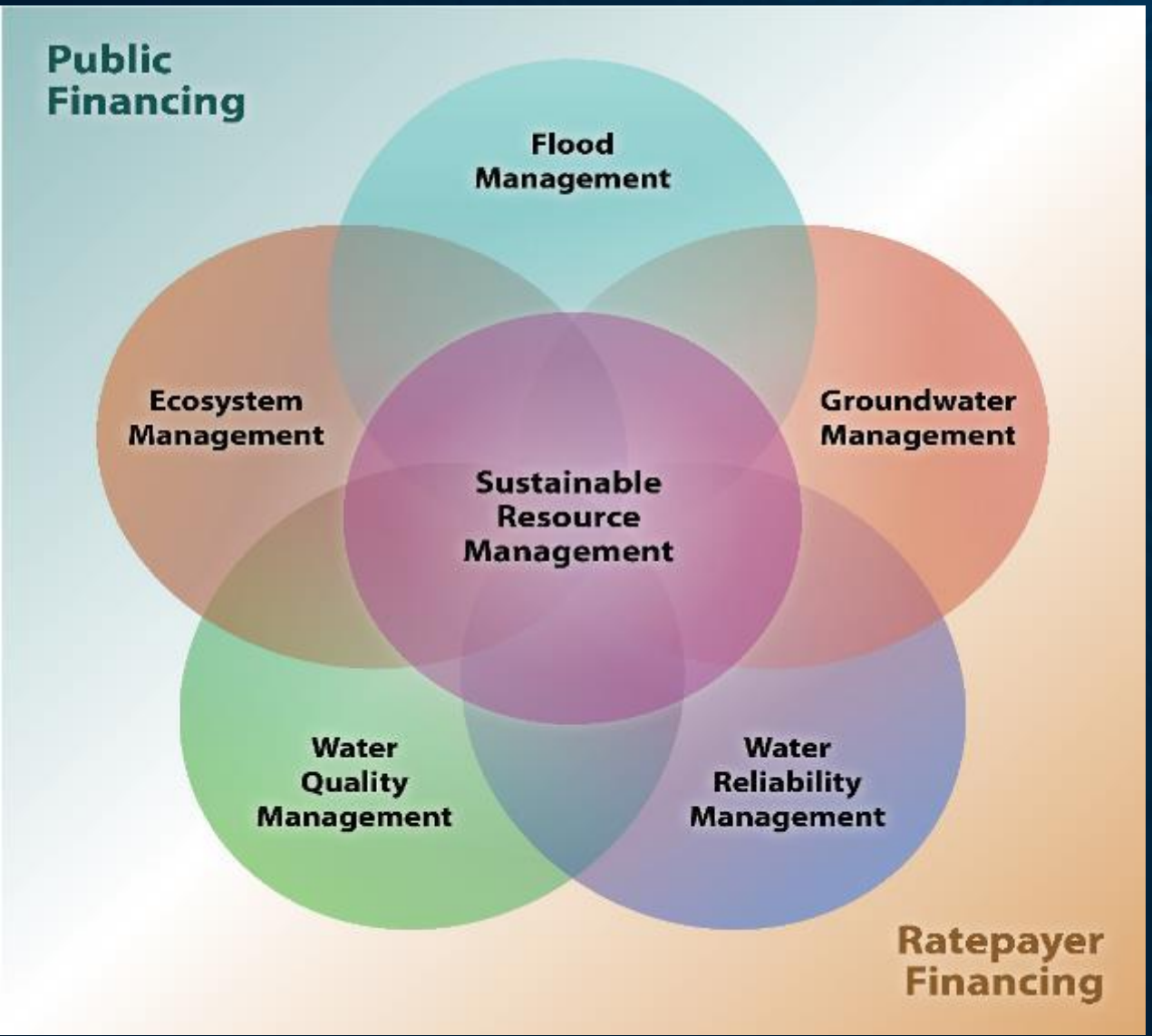
Goals to Overcome Challenges

1. New & Modernized Infrastructure & Restored Ecosystems
2. Improved Alignment of Decisions, Initiatives & Actions
3. Improved Regulatory Outcomes
4. Informed & Adaptive Decision-Making
5. Sufficient and Stable Funding

Sustainability Requires
Alignment & Integration



Integrated Watershed Management

Multi-Sector Collaboration

Multi-Discipline Planning

Multi-Benefit Projects

Multi-Fund Investments

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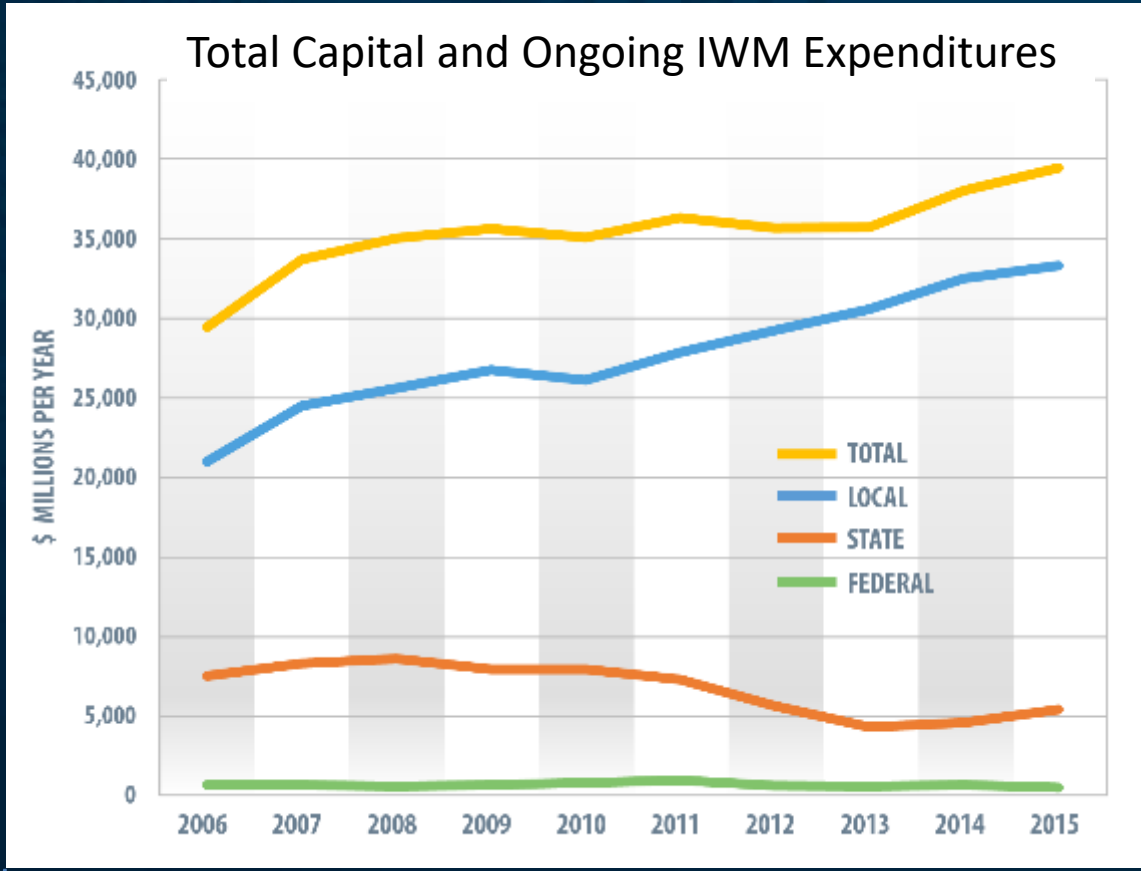
Recommended Actions

- Improving integrated watershed management
- Improving resiliency and operational flexibility of infrastructure systems (green & grey)
- Building trust-based partnerships and empowering California's most vulnerable communities
- Improving real-time decision-making, adaptive management, and long-term planning
- Improving inter-agency alignment and addressing persistent regulatory challenges
- Providing sufficient and stable funding

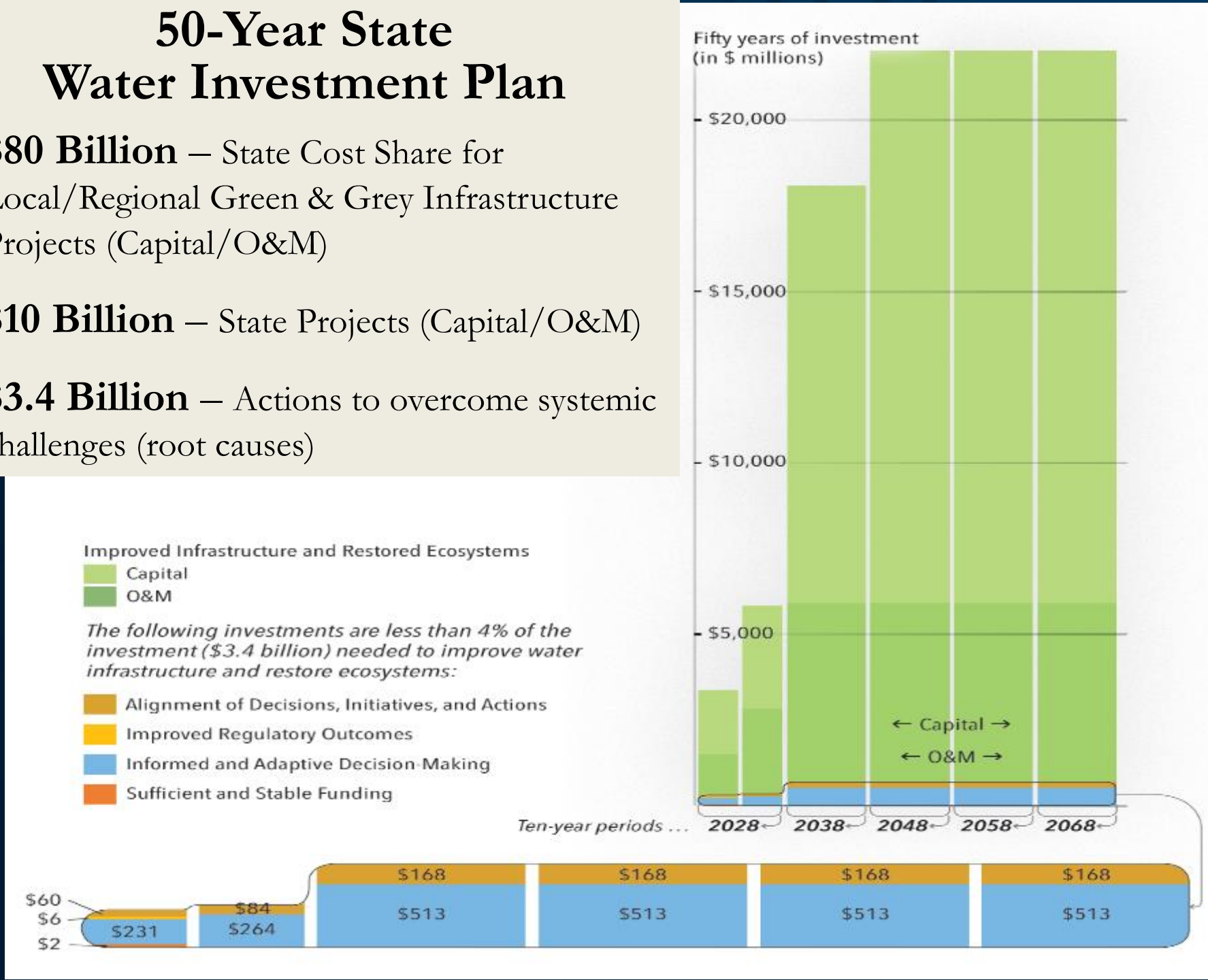
Sustainability Requires
Sufficient & Stable Funding

- State expends ~ $2 Billion/year on water management
- State allocates only 2% of State General Fund for water
- Local/regional entities pay ~ 80% of investment
- Investment backlog is *at least* $350 Billion over next 50 years



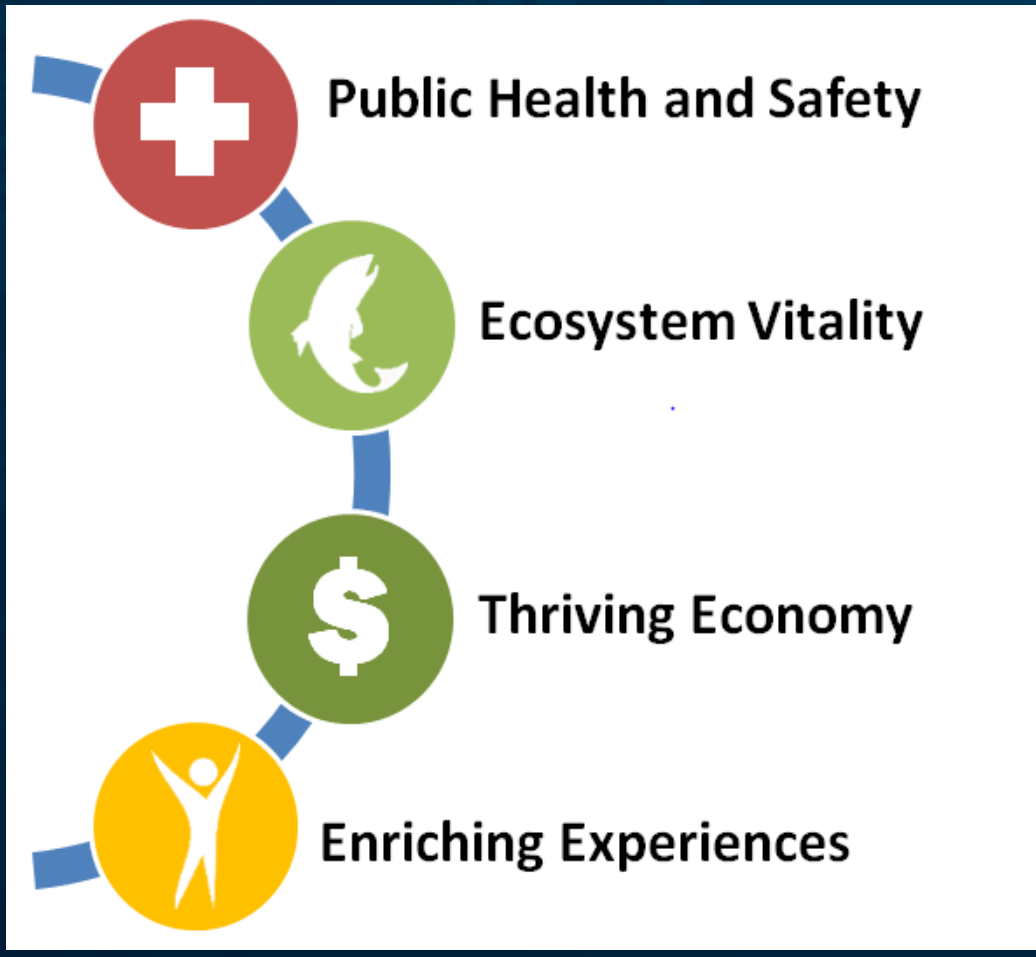
50-Year State Water Investment Plan

- **$80 Billion** – State Cost Share for Local/Regional Green & Grey Infrastructure Projects (Capital/O&M)
- **$10 Billion** – State Projects (Capital/O&M)
- **$3.4 Billion** – Actions to overcome systemic challenges (root causes)



Sustainability Requires
Consistency with Values

The combined effect of actions and projects within watersheds and groundwater basins is consistent with the four societal values, while fostering trust and promoting equity.



The Sustainability Outlook

Demonstrate Return on Investment

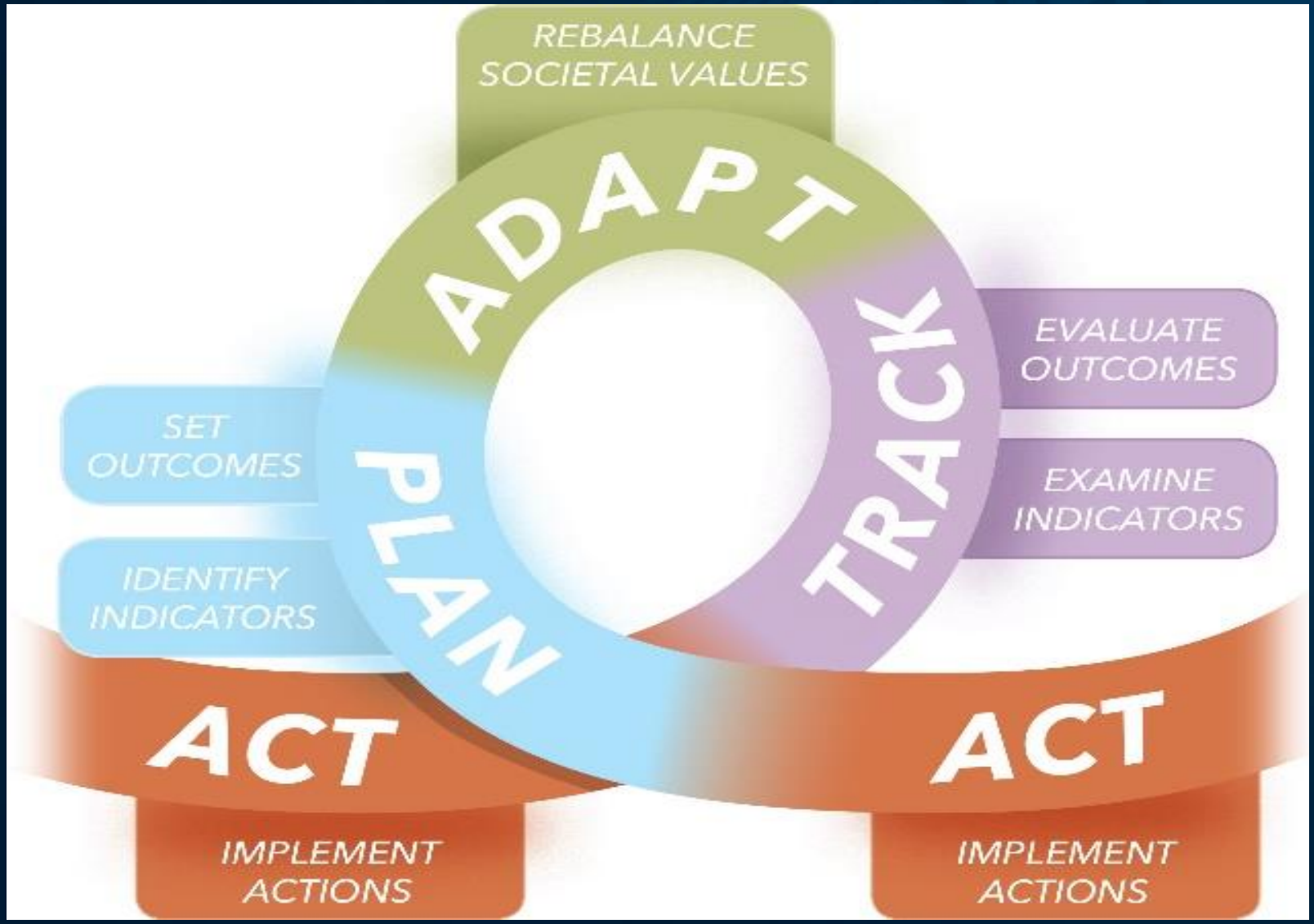
Sample Societal Value	Sample Intended Outcome	Sample Sustainability Indicator
Public Health & Safety	**An adequate water supply for domestic needs, sanitation, and fire suppression**	**Number of public water systems (population served) not in compliance with drinking water standards**
4	1 dozen	3 dozen

Update 2018 Watershed-Scale Pilots
Outlook is Aggregate of Regional Sustainability

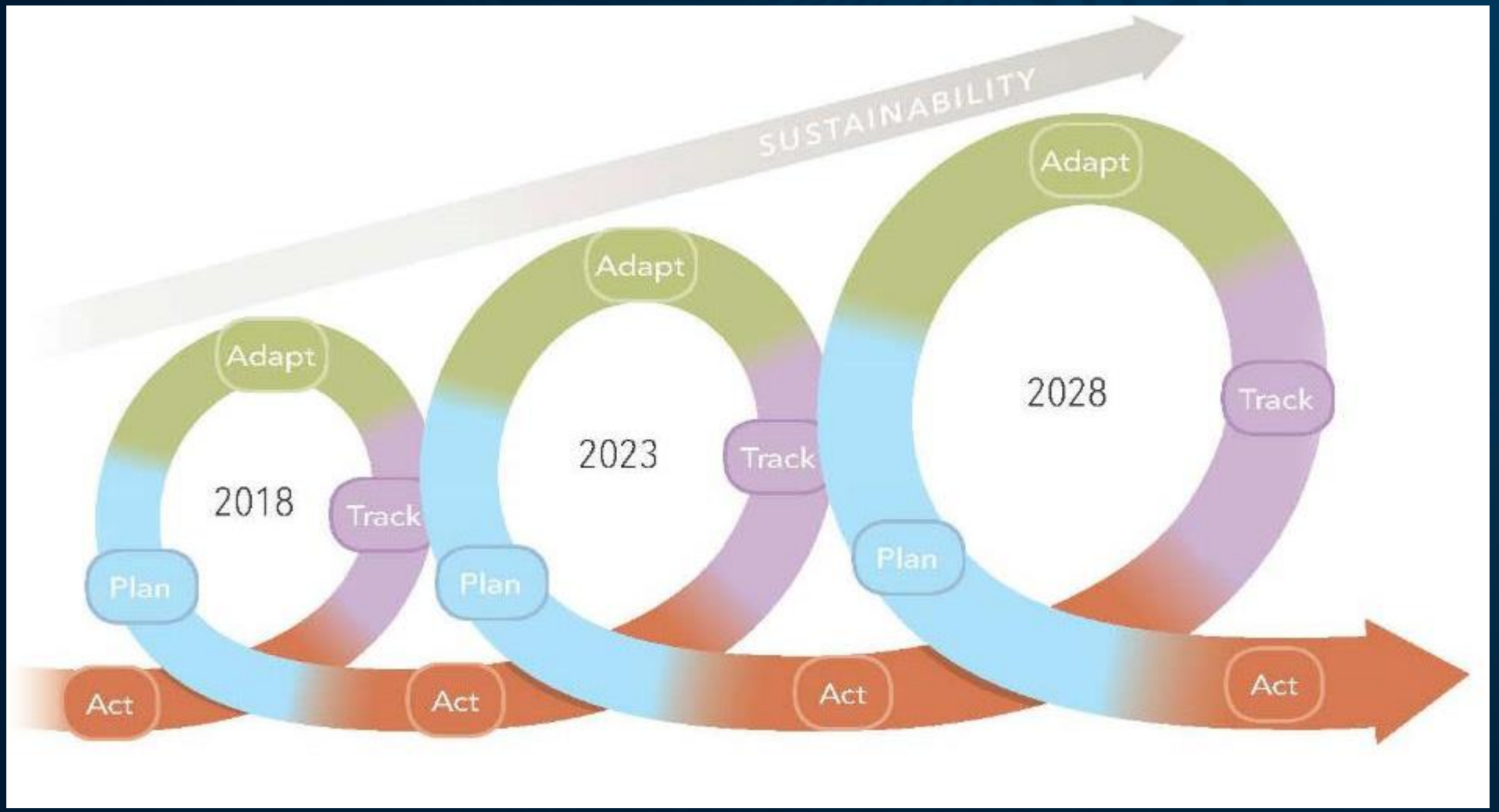
- **Applying Sustainability Outlook locally**
  - Proof of concept & scalability of indicators
  - Local/regional perspectives on impediments to sustainability
  - Place-based solutions for governance, regulations & funding

- **Initiated pilot projects in partnership with:**
  - California Forward
  - Pacific Institute
  - Water Foundation
  - Sonoma County Water Agency
  - Santa Ana Watershed Project Authority

Sustainability Requires
Tracking & Adaptive Management



Sustainability Requires **Time & Commitment**
It is a Journey, not a Destination



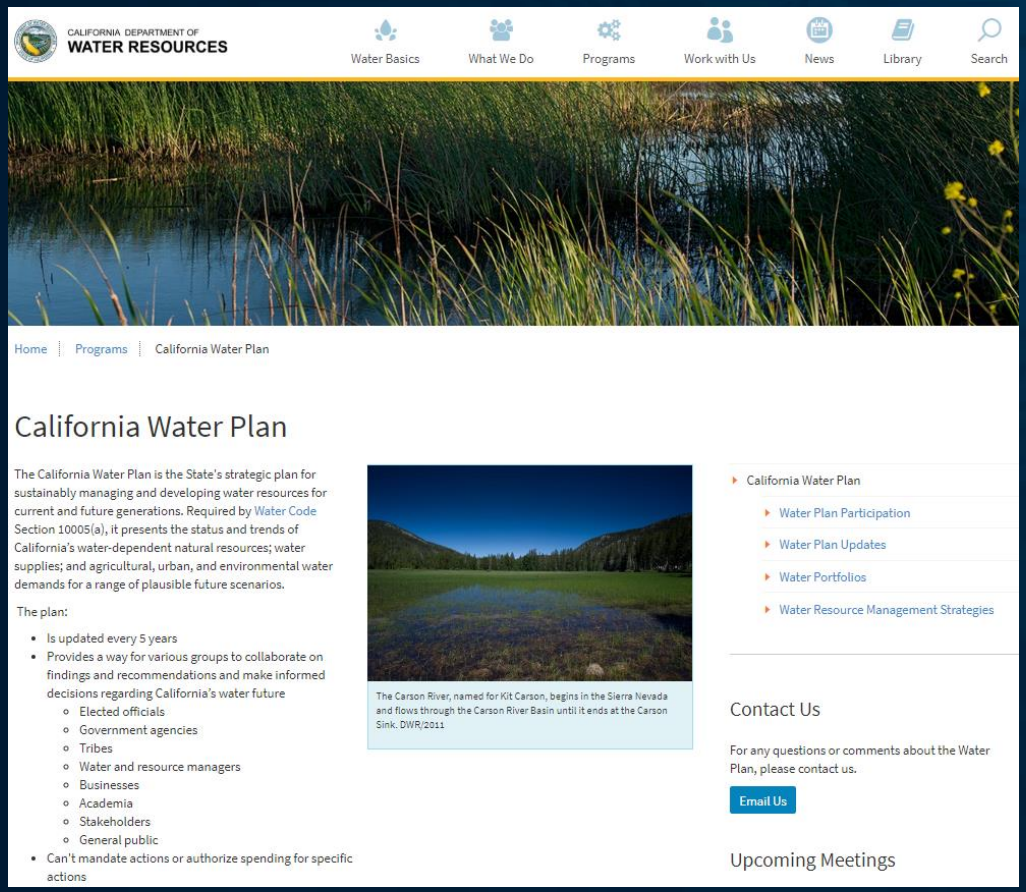
Update 2018 Sets the Stage for a More Effective Long-Term Adaptation

Applying Update 2018 Tools
The Way Forward

- ***Vision –*** Shared intent and outcomes to align actions
- ***Recommended Actions –*** Reflect State priorities and values
- ***Sustainability Outlook –*** Track outcomes/return on investment
- ***Funding Options –*** Stable funding for effective action
- ***Implementation Plan –*** Authorize & initiate actions/projects

Ways to Access Water Plan Information

➢ *Visit the Water Plan Web Portal*



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Questions & Comments

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Statewide Integrated Water Management
CA Department Water Resources

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Management Tools and Strategies in Action

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Working Lunch

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Keynote Speaker
California State Controller
Betty T. Yee

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Interactive Gaming Demonstration

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California Water Plan Update 2018

Making decisions within dynamic and complex systems

Paul Massera, P.E.

Water Plan Program Manager

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Session Purpose

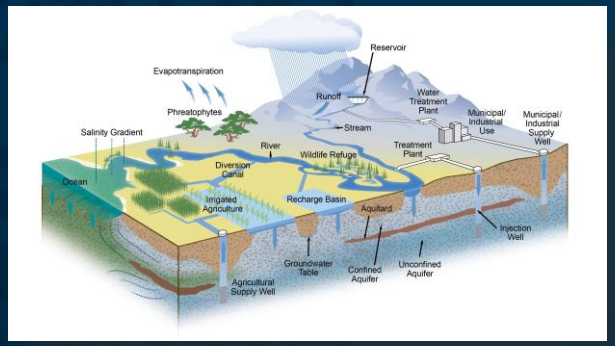
Participants experience the power of models to support decision-making:

- Without all desired information
- Using limited management options
- Within a complex and interconnected system

System Scale Management

Geographical Scale of Today's Demo Activity:

- Watershed (example)



Potential Scales of SimBasin:

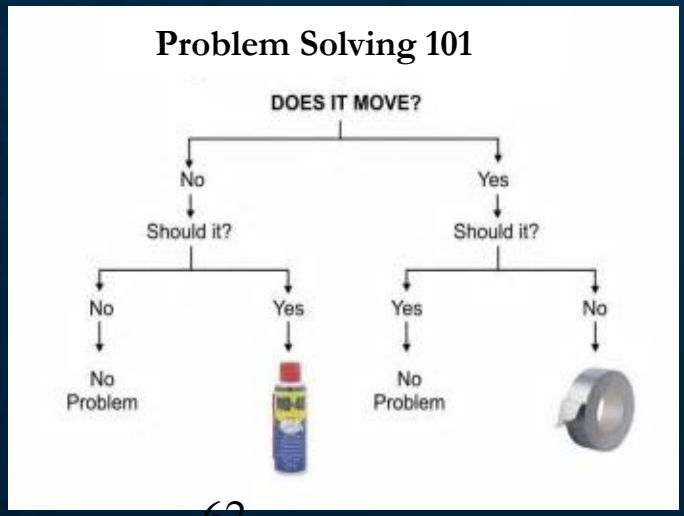
- GSA or GSP Area
- IRWM
- Hydrologic Regions
- …

Statewide water management "Wicked" Dilemmas

Life was simpler back when I knew-it-all

Next Gen Decision Support

1. Decisions must be made now.
2. Need more than mental models and advocacy.
3. Data enables more effective investment.
4. Iteration/adaption within complex systems.
5. Cross-disciplines, sectors, and jurisdictions.



SimBasin:

1. Enables stakeholders and scientists to critically compare mental and computer models, with useful shared-insights gained.
2. Simulates past and future decisions.
3. Promotes “serious gaming” as a viable planning tool.
4. Fosters a sense of urgency for it’s development and expanded use.

Final Thoughts (SimBasin)

1. Effective decision-making requires more than mental models and advocacy.
2. Analytical tools can be used to manage at hydrologic scale using existing institutions.
3. SimBasin-type tools can be effectively coordinated with many aspects of the California Water Plan.
4. Data-based decisions are only as good as the data.

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Break

Will return in 15 mins

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Impact of Recent Court Decisions on California Water

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The Foundation of the Water Plan Data Driven Decision Making

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Data-Driven Decision-Making

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Data-Driven Decision-Making

Water Balances *Tito Cervantes*

Water Budgets *Paul Shipman*

Climate Change *Emily Alejandrino*

Future Scenarios *Mohammad Rayej*

Land Use *Curtis Anderson*

Remote Sensing with Drones *Gary Darling*

Watershed Mapping *Matthew Correa*

Stormwater Targets *Nirmala Benin*

Recycled Water Use *Richard Mills*

Water Conservation *Peter Brostrom*

Open and Transparent Data *Chris McCready*

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Data-Driven Decision-Making

Water Balances

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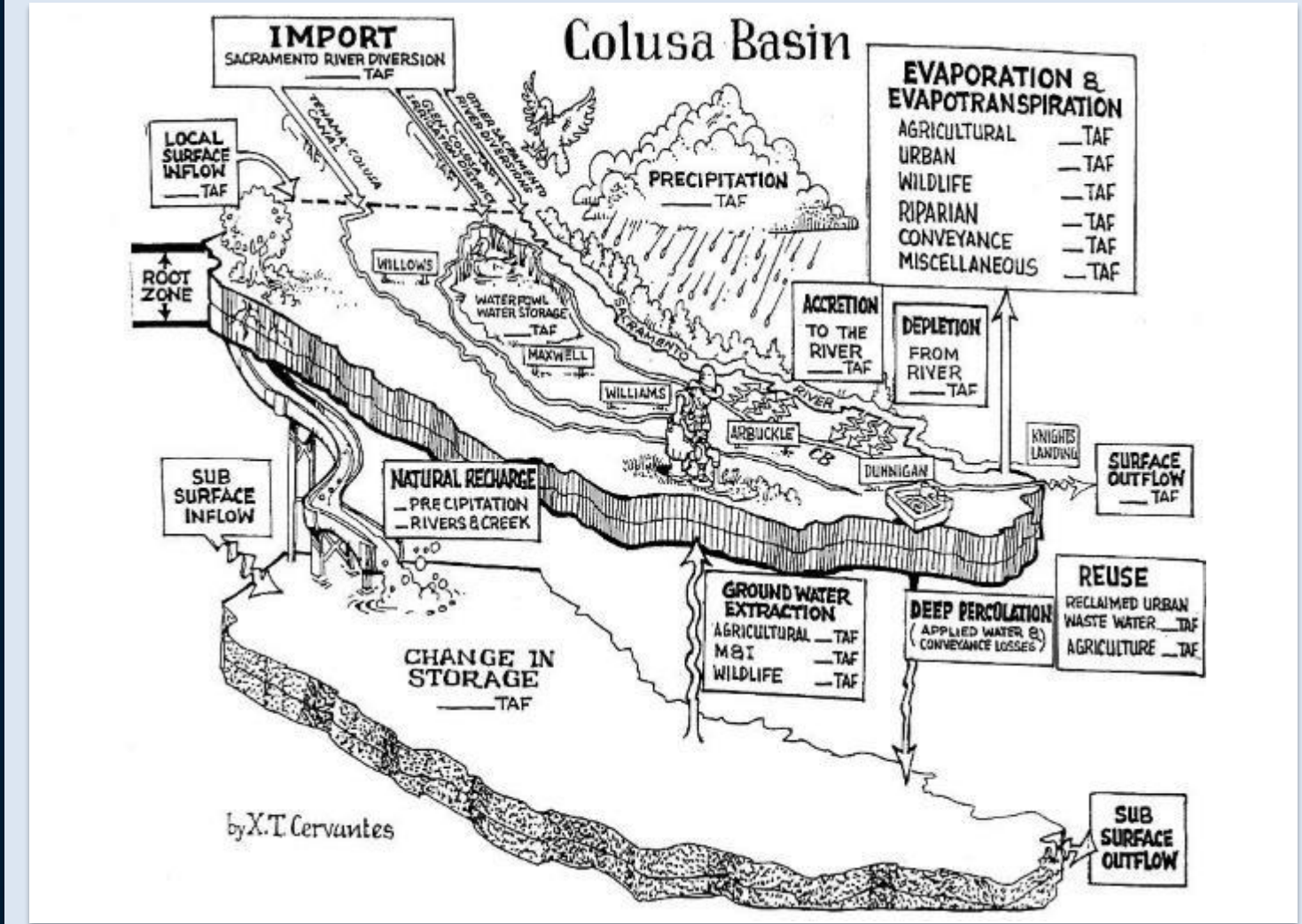
water.ca.gov/Programs/California-Water-Plan/Water-Portfolios

Water Balances Key Components



Water Balances Decision-Making

- Local collaboration, data by county
- Water supply by sector
- Transparency
- Improving technology and water management decisions
- Water quality and climate change
- Tribal, SGMA, and Delta Fix
- Annual basis

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Data-Driven Decision-Making

Water Budgets

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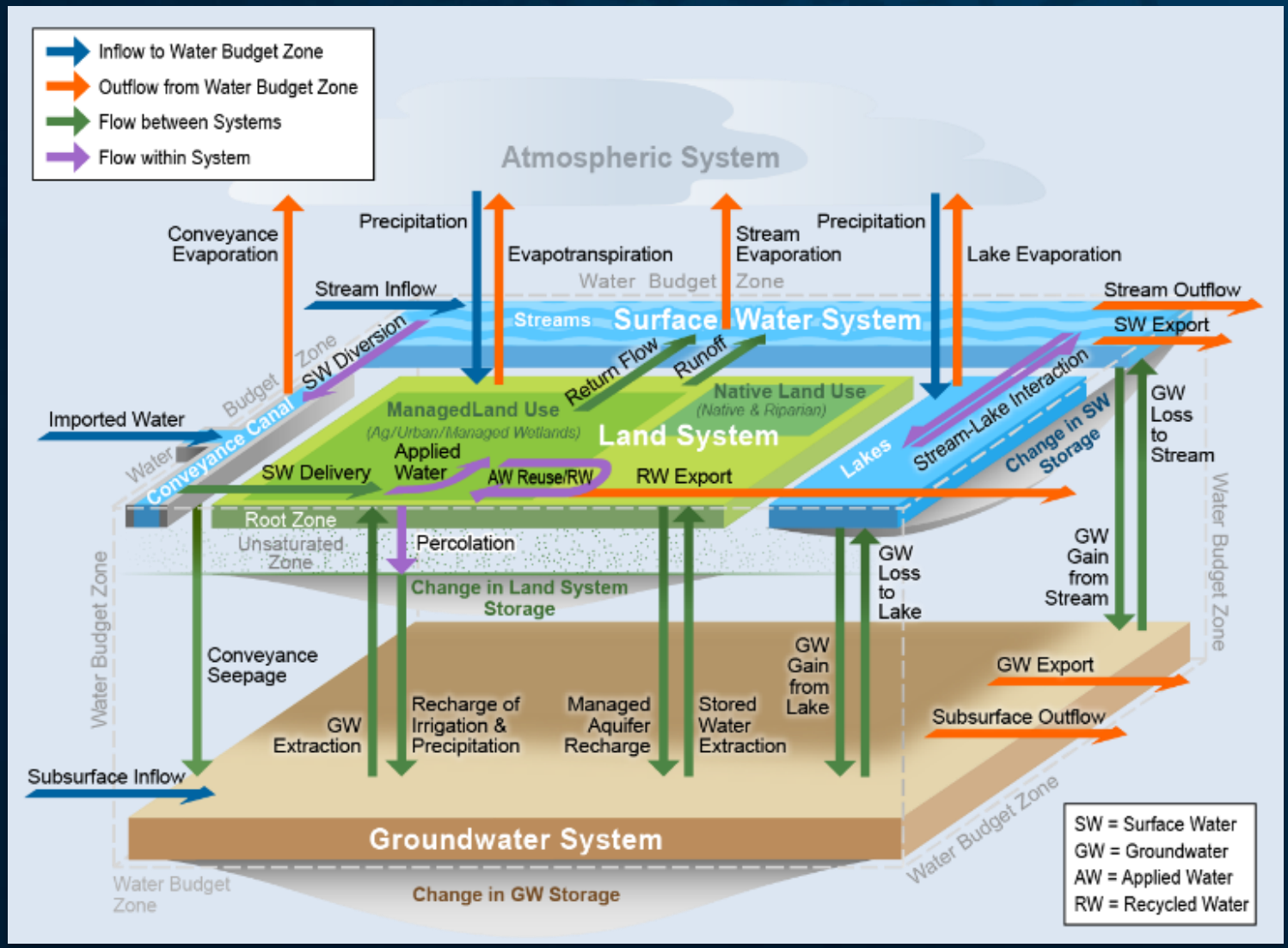
public.tableau.com/profile/salma7330#!/vizhome/RegionalWaterBuget_Basins_Published_4/BaseMaps

Water Budgets Key Components



Water Budgets Decision-Making

- *Water Budget Development Practitioner's Handbook*
  - Establishes framework and common vocabulary
  - Describes components
  - Provides estimation methods and examples
  - Furnishes catalogue of data sources
- Water budget dashboards
  - At-a-glance water budget summaries

Questions?

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Data-Driven Decision-Making

Climate Change

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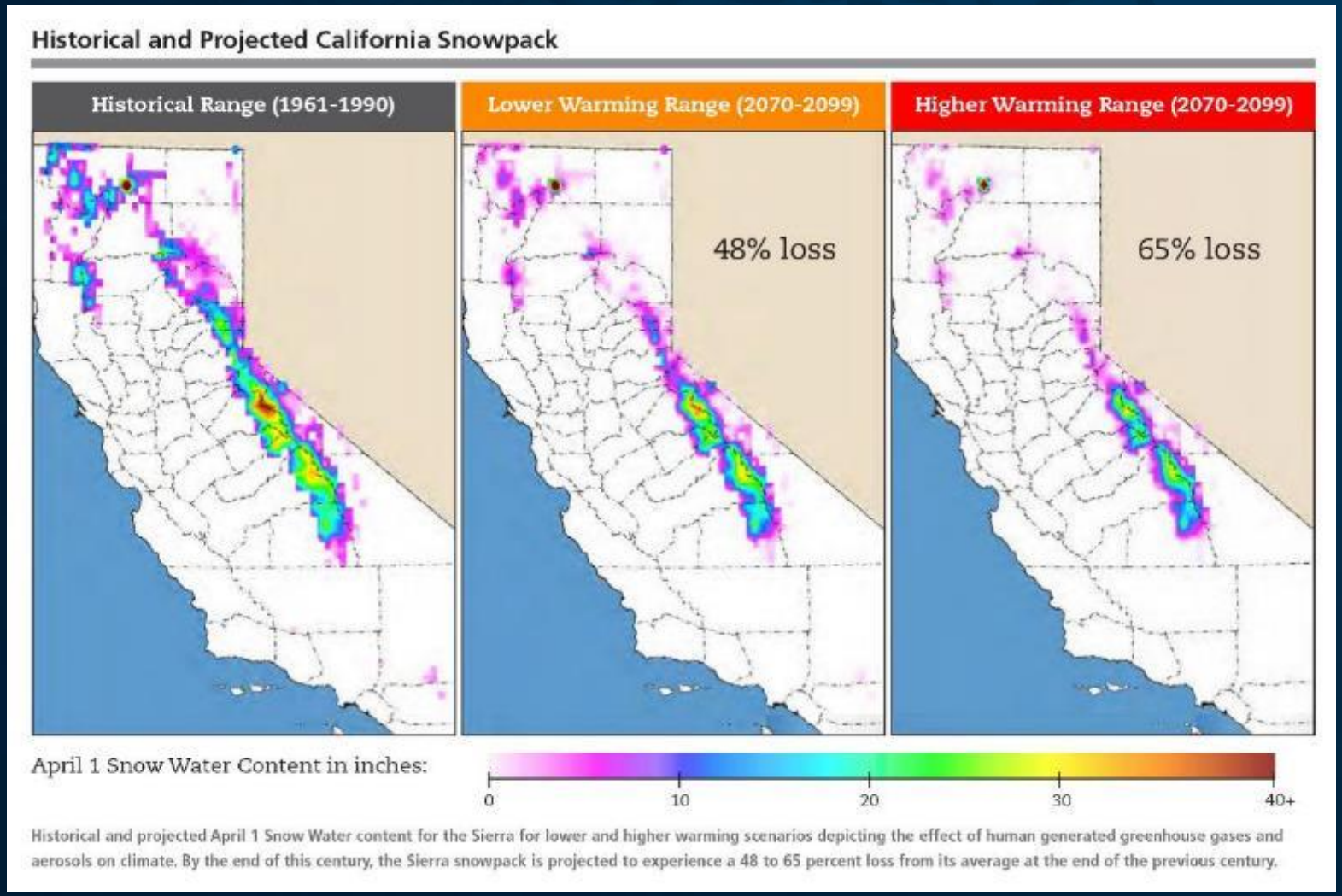
water.ca.gov/Programs/All-Programs/Climate-Change-Program

Climate Change Key Components



Climate Change Decision-Making

- DWR's climate change program
  - Climate mitigation and adaptation
  - Water supply, reliable flood control, and healthy ecosystems
- *Climate Action Plan*
- What's next?
  - Work with water managers
  - *CWP Update 2018*
  - Action 4.7.3 Climate Science and Monitoring Program

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Data-Driven Decision-Making

Future Scenarios

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Future Scenarios Key Components

- What is it?
  - Future water conditions to 2100
  - 20 climate scenarios x 5 urban growths scenarios = 100 scenarios
  - Central Valley, California
  - Water Evaluation And Planning Model (WEAP)
- Current and future activities
  - Post-processing of model results
  - **New technical report:** *Future Scenarios of Water Supply and Demand in Central Valley, California Through 2100*
  - Web-based Tableau Dashboard

Future Scenarios Decision-Making

- Water supply and demand
  - Unmet demand
  - Maps of vulnerable areas
  - Supply reliabilities
- What to improve?
  - Expand statewide
  - Data storage
  - Faster web-browser
  - Communication and access for all data users

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Data-Driven Decision-Making

Land Use

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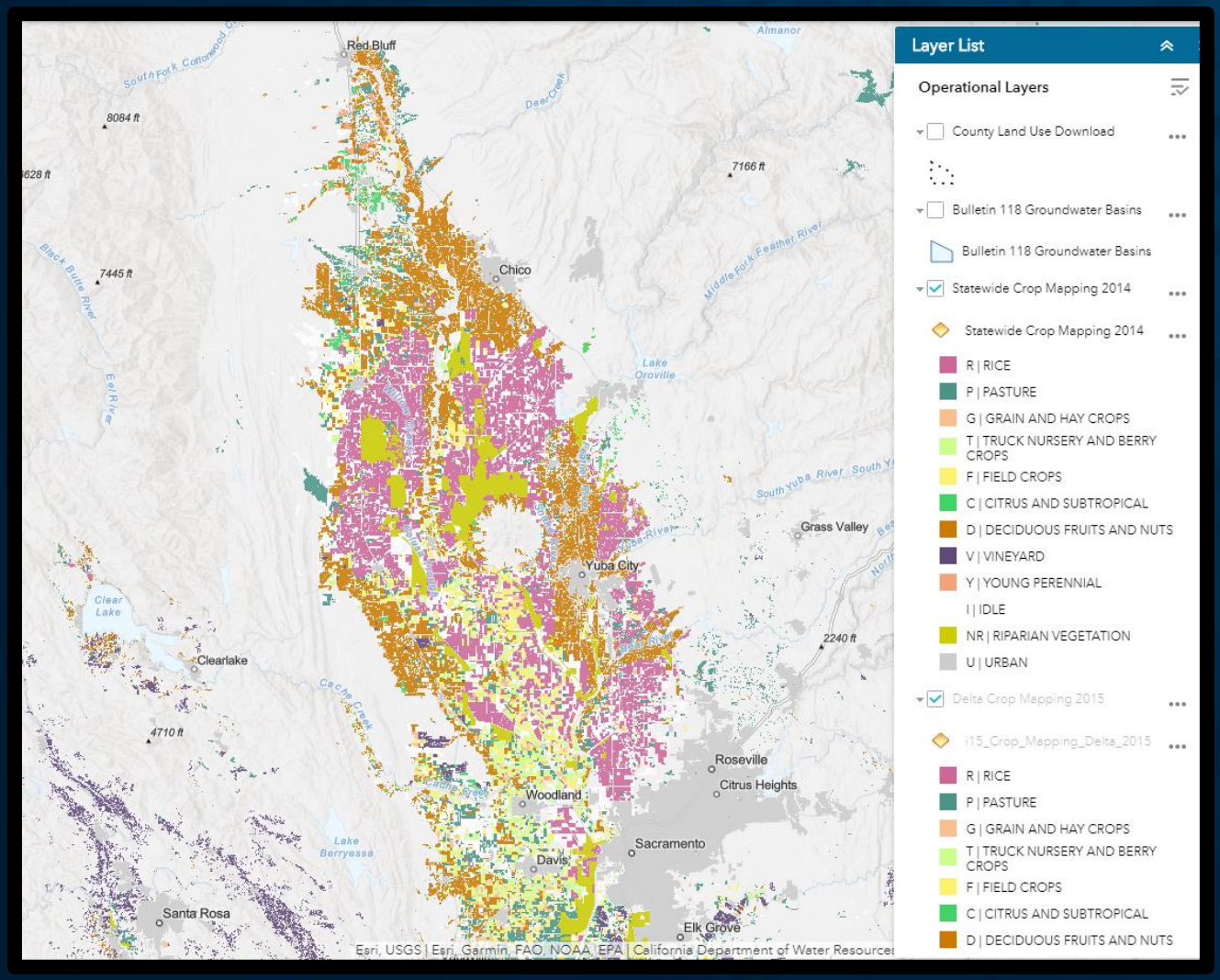
gis.water.ca.gov/app/CADWRLandUseViewer

Land Use Key Components



Land Use Decision-Making

- Statewide crop mapping for 2014 used remote sensing technology for first time ever!
- What's next?
  - 2016 statewide
  - 2018 statewide, with multi-cropping included
- 4,500 unique users and 370 downloads
- Foundational data set
  - California Water Plan
  - Sustainable groundwater management
  - Water use efficiency
  - Water management planning at all levels

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Data-Driven Decision-Making

Remote Sensing with Drones

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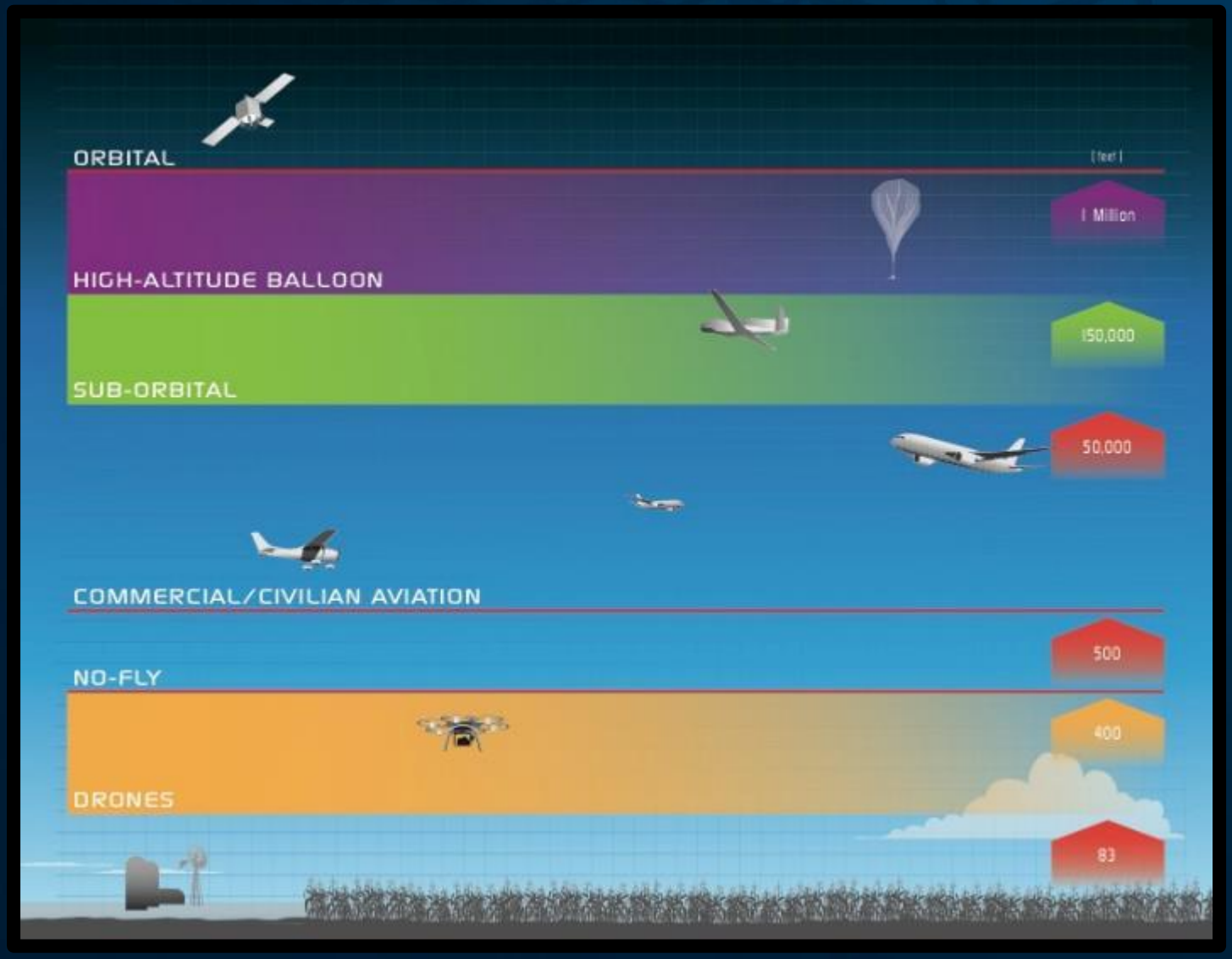
Remote Sensing with Drones



Remote Sensing with Drones
Decision-Making

- Drone policies, procedures, forms
- Environmental
- Flood management
- Construction, operations, and maintenance
- Hydrodynamic modeling
- Energy
- Precision agriculture

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Data-Driven Decision-Making

Watershed Mapping

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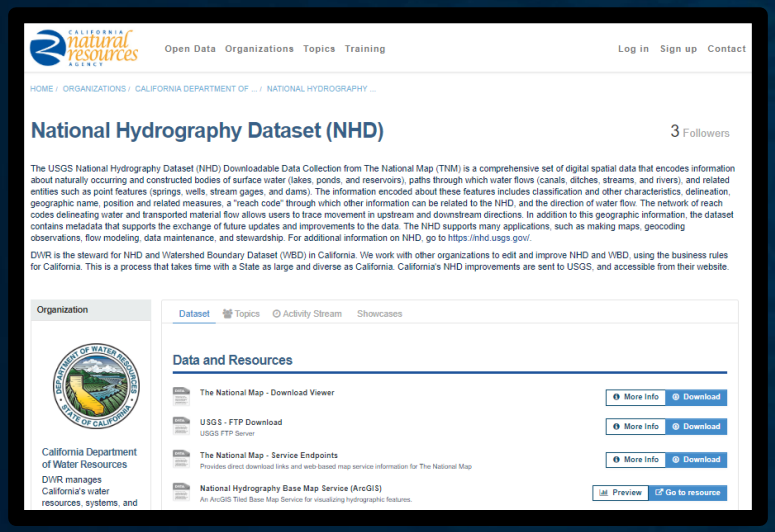
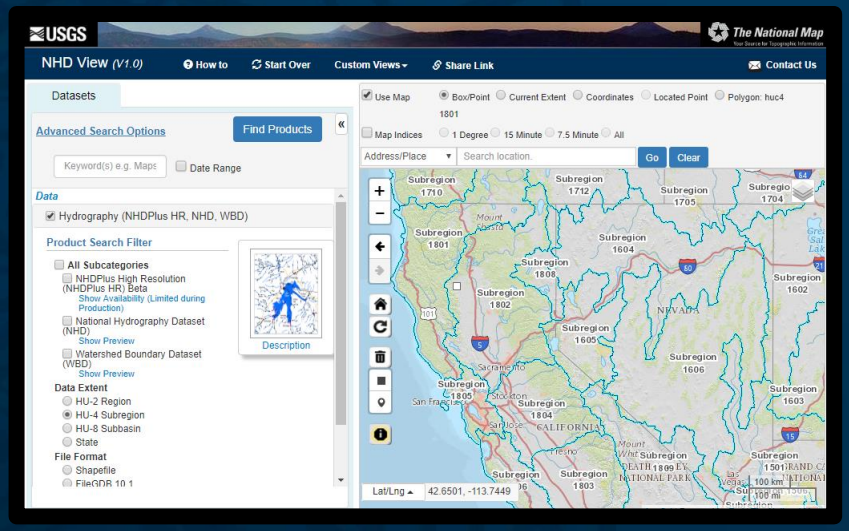
wdl.water.ca.gov/waterdatalibrary/NHD/index.cfm

Watershed Mapping Key Components

- State-federal partnership
  - National Hydrography Dataset
  - Watershed Boundary Dataset
- Improved mapping of watersheds and water features

Watershed Mapping Decision-Making





- Data stewardship
- Seamless geospatial framework
  - Modeling
  - Analysis
  - Visualization

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Data-Driven Decision-Making

Stormwater Targets

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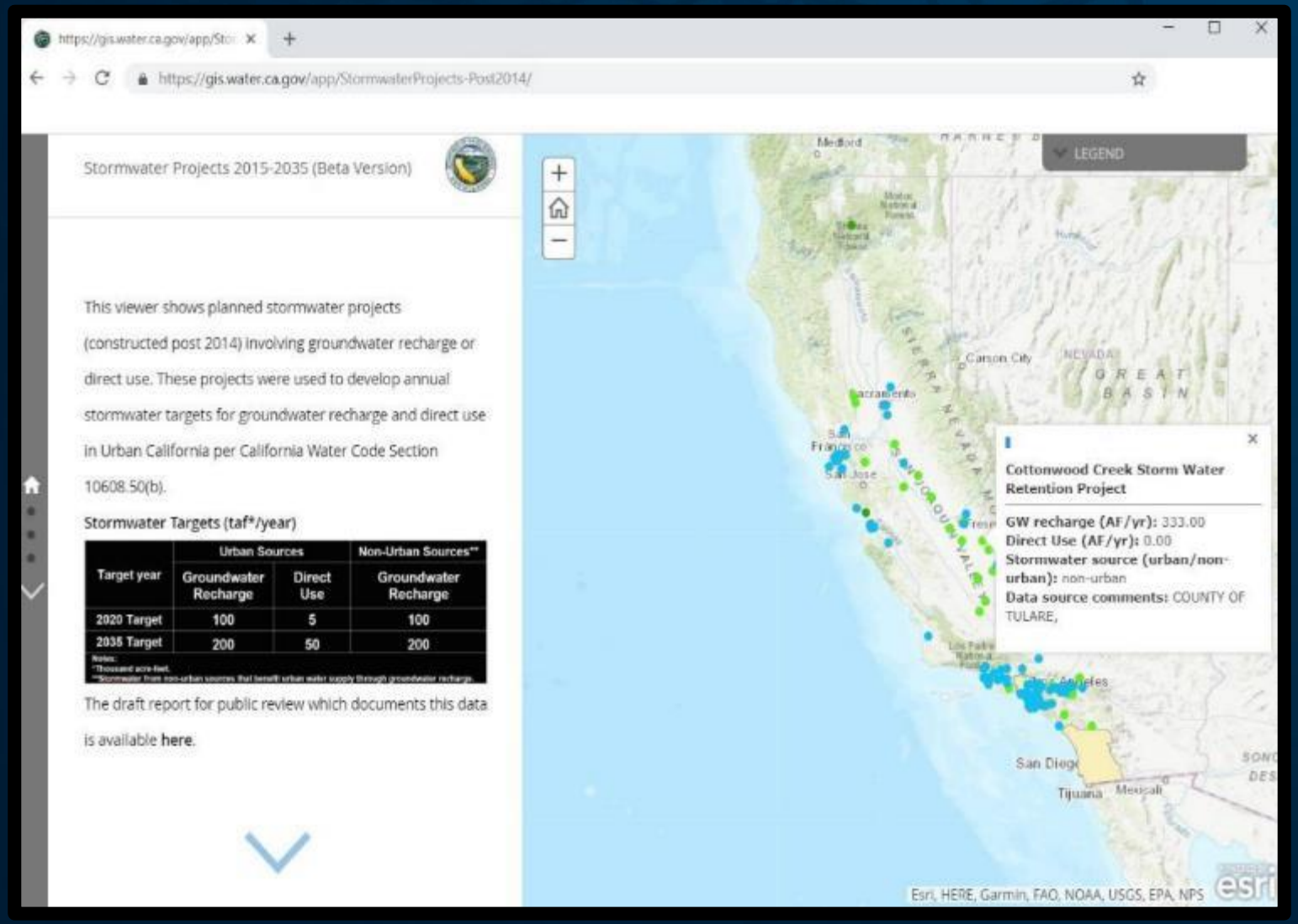
gis.water.ca.gov/app/StormwaterProjects-Post2014

Stormwater Targets Decision-Making

- Statewide targets for groundwater recharge and direct use of urban stormwater
- Draft report available for public comment
  - Webinar with Q&A session: October 18
  - Comments are due: Oct 31
- Updated RMS for urban stormwater

Stormwater Targets Key Components



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Data-Driven Decision-Making

Recycled Water Use

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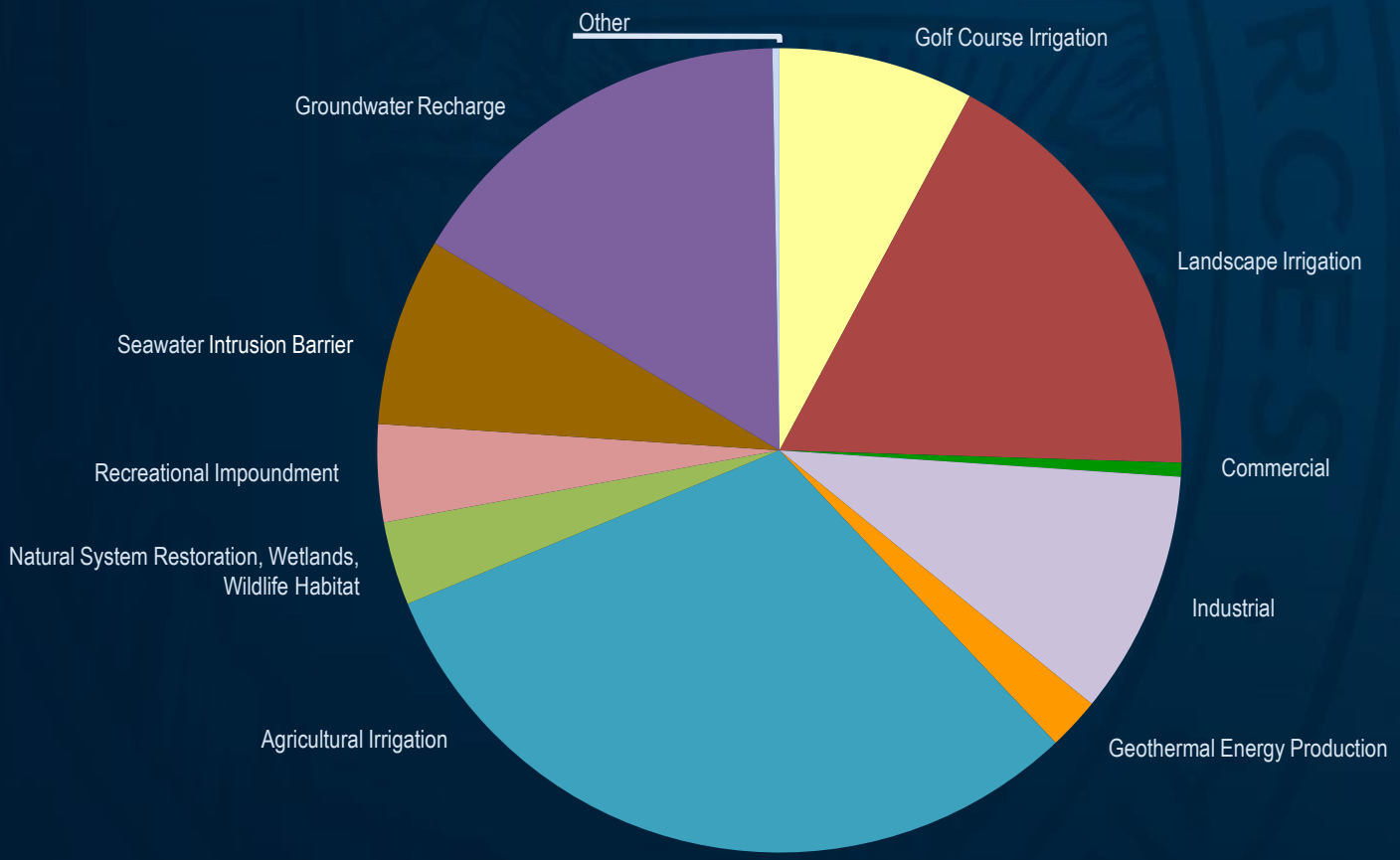
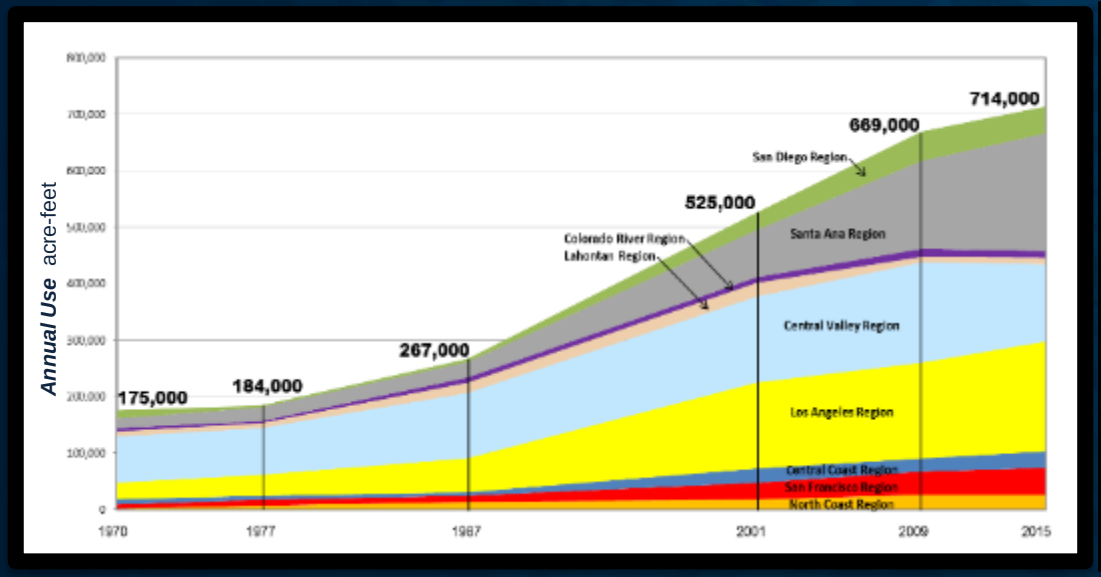
waterboards.ca.gov/water_issues/programs/grants_loans/water_recycling/munirec.shtml

Recycled Water Type and Quantity



Recycled Water Location and Collection



- DWR / SWRCB survey
- UWMPs
- Primary data user is the California Water Plan team

Recycled Water

- Geospatial referencing of recycled water systems

Los Angeles – RW distribution system

RW Use Area

Wastewater Treatment Plant

- Fall 2018 SWRCB revision to the recycled water policy
- Modifications to the 2020 Urban Water Management Plan reporting
- Desalination data in the next CWP

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Data-Driven Decision-Making

Water Conservation

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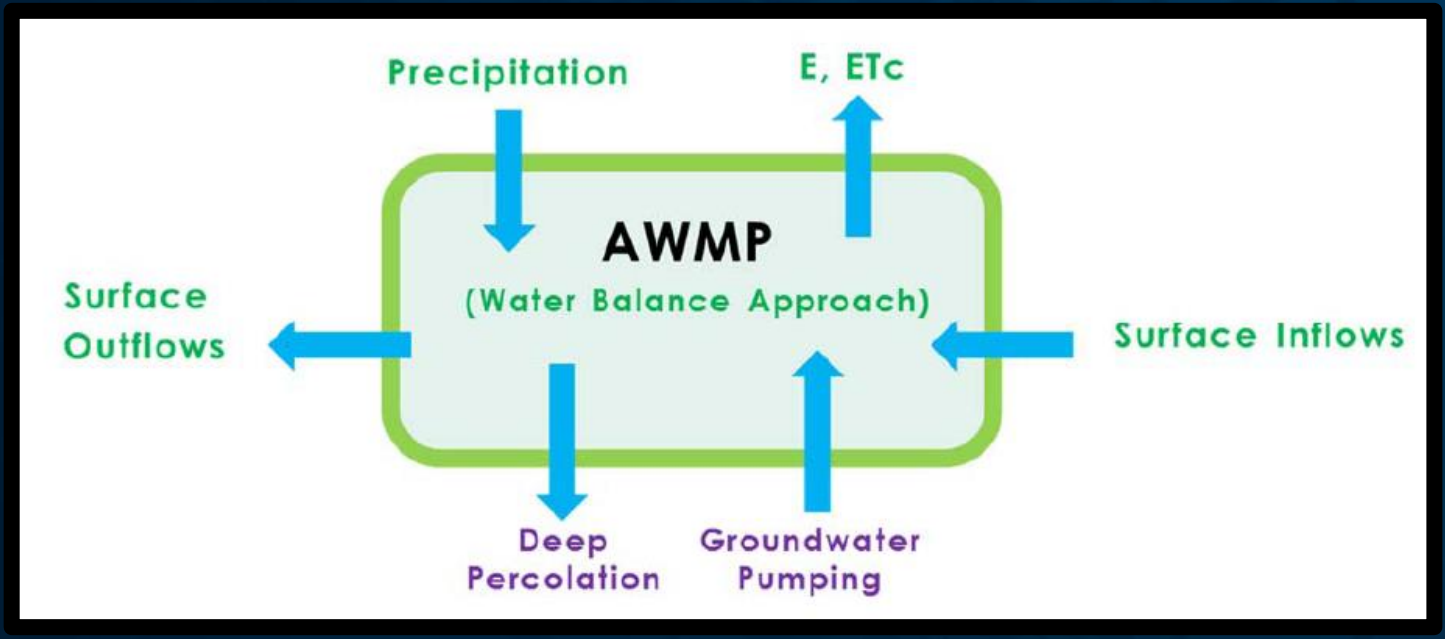
water.ca.gov/Programs/Water-Use-And-Efficiency

Water Conservation Ag Water Use



Water Conservation Urban Water Use

Indoor Residential

Outdoor Residential

CII Dedicated Irrigation Accounts

Distribution System Water Loss

Urban Water Use Objective

Water Conservation

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Data-Driven Decision-Making

Open and Transparent Data

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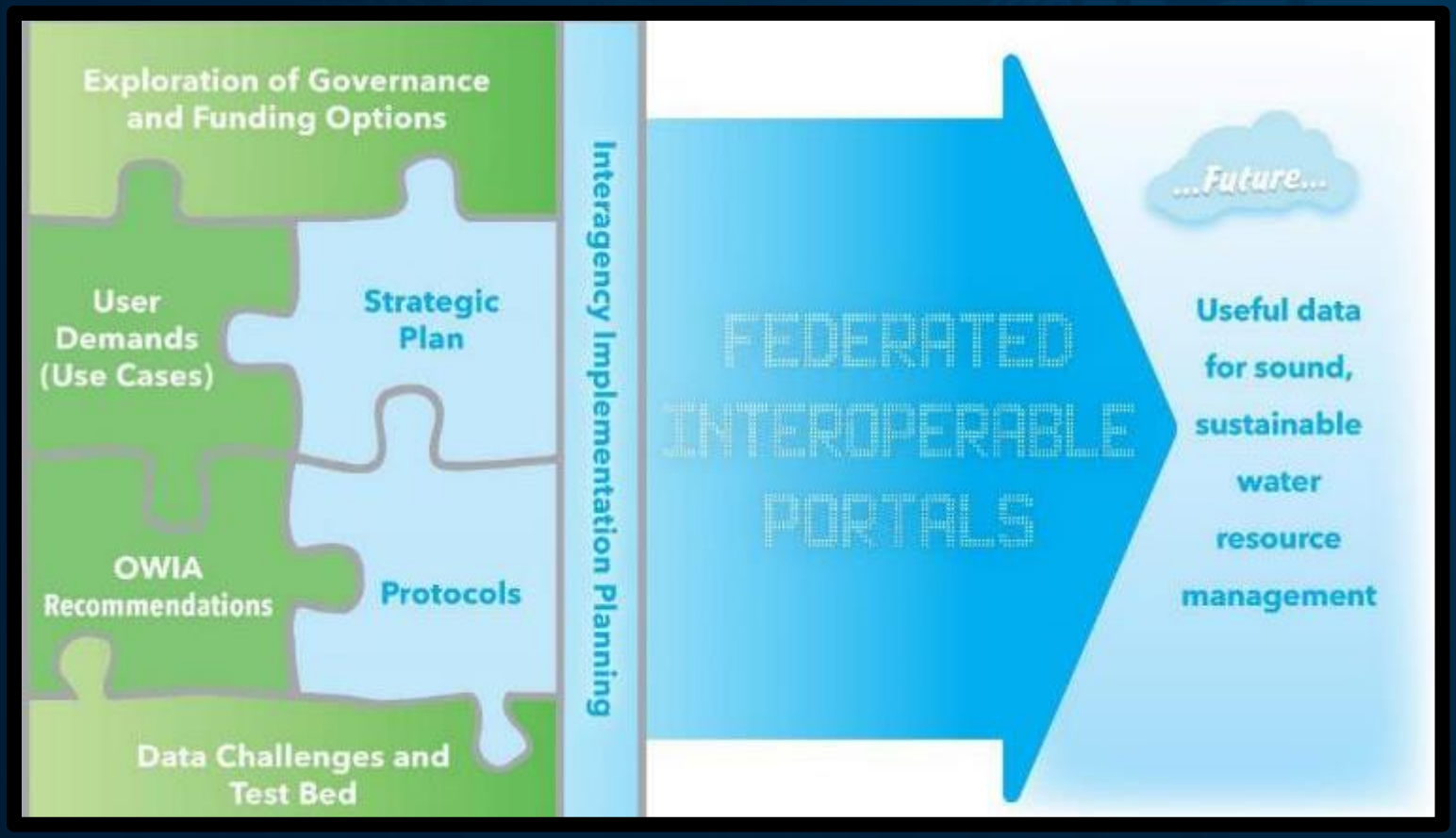
water.ca.gov/Programs/All-Programs/AB-1755

Open and Transparent Data
Key Components

- Open and Transparent Water Data Act (AB 1755, Dodd)
- DWR, CWQMC, SWRCB, CDFW
- State and federal datasets
- Platform and protocols
- Data integration, efficiency, access, usability
- Improved analysis across disciplines
- Foster innovation and scientific discovery
- Better-informed decisions and cost-effective investment

Open and Transparent Data
Decision-Making



Questions?

CALIFORNIA DEPARTMENT OF WATER RESOURCES

California Water Plan Update 2018 Plenary

Wrap-up

Return tomorrow at 8:30 am